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ABSTRACT

The second of a three-part series on computer-assisted instruction (CAI), this report focuses on the use of microcomputers in business education, English, social studies, foreign languages, bilingual education, and ESL (English as a Second Language). Since all these areas involve writing, a discussion of word processors and word processing software precedes more specific discussions of courseware in each area. Then seven exemplary programs at various schools around the country are described in detail. These include a 3-year sequence in computer science for business; a word-processor-based typing and accounting program that was extended to include English composition and creative writing; a language instruction program for non-English speakers; a seven-phase scheme for integrating word processors into an English composition curriculum; a districtwide center for coordinating educational technology; the work of an innovative principal in San Jose, California, who has implemented computer-assisted instruction in two different high schools and (at the time of this publication) was organizing an Institute on Microcomputers in Secondary Education; and a 5-year plan directed by a districtwide steering committee on computers. At the head of each description are the name and address of the school or school district implementing the program and the name and position of a contact person. (TE)

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Vol. 13 No. 3 January 1984

Part II
Using Microcomputers For Instruction in Humanities and Social Sciences

"The most important learning aid since chalk." That's the slogan of *Window*, the new instructional electronic monthly magazine on floppy disks for Apple II microcomputers. The slogan applies even more to micros and courseware for classroom learning in general.

Part I of this *Curriculum Report* series (Nov. 1983) dealt primarily with an overview of computer-assisted instruction (CAI) in high school classrooms with a focus on the academic disciplines of computer science, mathematics, and science. Those are the courses in which it was expected that the academic microcomputer revolution of the '80s would most appiy.

The focus of this issue, Part II, is on use of micros as aids (tools, resources) in business education, English, social studies, and foreign languages, bilingual education and ESL (English as a Second Language) classes. Part III will deal with student learning with micros in special education, vocational education, and the fine and practical arts.

Word Processing Across The Curriculum

If student writing is to improve, writing opportunities in all curricular areas must be provided, according to proponents of Writing-Across-the-Curriculum projects (see *Curriculum Report*, Jan. 1983). The most effective tool for writing since 1780, when steel-point pens were invented, is word processing software for microcomputers.

Writing with a word processor makes editing effortless. Adding to, taking from, and moving around of text is simple. The changes are displayed at once, "typed" on the screen with no deletions, marks, or scribbles in margins. With the additional use of software that "checks" grammar, spelling, and punctuation, errors in syntax and mechanics are reduced. Student creativity is not stifled by laborious correcting of errors.

From the highly sophisticated *Writer's Workbench* developed by Bell Laboratories for its technical writers, but now available to schools, to the *Bank Street Writer*, the first word processing software designed by Scholastic, Inc., specifically for the young writer, word processors are a boon for all students and their teachers, as well as for the journalist, author, or secretary.

Bank Street Writer, Applewriter II, Magic Window, Wordstar, and *Superscript* are all usable with Apples. *SCRIPSIT* and *SuperSCRIPTSIT™* are designed for TRS-80s, *Pupermate* and *Word Pro 4 Plus* for Pets, and *Easyscript* for Commodore 64s.

The fall 1983 conference of the Illinois Association of Teachers of English offered 25 workshops on the teaching of writing, and 6 of them were entirely devoted to improving student writing with word processors. Instructors from several Illinois high schools and universities demonstrated how word processors have made their students more skilled in writing but also considerably more enthusiastic about a task most students have disliked in the past.

Business education letters and reports; personal, creative, and expository compositions for English; essays in a foreign language and translations; and themes and research papers for social studies, all become less of a struggle when students have the help of a word processor.

Business Education

Besides word processing for business writing, other micro programs are useful to teach students keyboarding, accounting, tabulating with spread sheets, graphic statistics, and plotting budget projections. Among the most widely used courseware in business education are four — all for Apples — produced by the Minnesota Educational Computing Consortium (MECC):

- *Business Volume 2* (grades 9-12) contains a set of programs that enable students to set up and experiment with a computer-based payroll system, print checks, and prepare W-2 forms.
- *Business Volume 3* (9-12) consists of four integrated systems: general ledger, accounts payable, accounts receivable, and inventory control. The courseware is designed to supplement an advanced or second-year accounting class.
- *Business Volume I* (senior high and adult levels) includes tutorials and problem-solving programs on interest on installment buying, effects of simple and compound interest, loans amortization, money supply, financial reports, payroll, and the 1040A tax form.
- *The Electronic Spreadsheet* (9-12) provides a tutorial to introduce students to the *VisiCalc™* commands. Sets of practical problems for solving with an electronic

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spreadsheet deal with consumer economics, record keeping, data entry, bookkeeping, office machines and procedures, and business management. (*VisiCalc*™ is a product of VisiCorp and must be purchased separately.)

English and Verbal Skills

Most courseware for English classes, other than word processors, implement drill or practice strategy. Some English skills require repetition, and some students require a great deal of patience. Drill and practice courseware has value in that the alternative is boring, programmed workbooks or teachers whose time is so limited in the classroom that some students receive insufficient individual help. A drill and practice lesson integrates with teacher-presented material and provides the teacher with the opportunity to add to drill items, such as vocabulary words for a specific work of literature. Micro tutorials are also useful as they present information, ask questions about it, and give individually tailored responses to student answers. Such a lesson simulates a tutor-student dialog.

Computers in the English Classroom: A Primer for Teachers by Sally N. Standiford, Kathleen Jaycox, and Anne Auten is an excellent resource for English departments embarking on a CAI and word processor curriculum. The 55-page booklet is published by ERIC Clearinghouse on Reading and Communication Skills and the National Council of Teachers of English, and is available for $5.50 from the NCTE, 1111 Kenyon Rd., Urbana, Ill. 61801.

Students preparing to take the SAT tests can refresh their verbal skills and review test-taking strategies with one of three drill and practice programs:

— NASSP's *Improving College Admission Test Scores: Verbal Skills* consists of three disks and an instructional manual that includes opposites, sentence completions, analogies, reading comprehension, grammar and usage, and sentence correction. The package is designed for Apple II, Apple II Plus, TRS-80, and Commodore PET.

— Maine Endwell Senior High School, Endwell, N.Y. gives an exemplary after-school, afternoon, and evening tutoring program, Preparation for the SATs, employing Borg-Warner Educational Systems' *College Entrance Preparation* courseware for the Apple II Plus.

— Harcourt Brace Jovanovich, Inc. has released *Computer SAT* for Apple II or Apple II Plus.

Six spelling and seven reading programs evaluated and recommended by the Educational Software and Evaluation Consortium in California for middle, junior, and senior high schools, are listed in the Oct. 1983 issue of *School Tech News*, a monthly publication which NASSP members receive. *Wordskill*, Science Research Associates' courseware in a game format that emphasizes synonyms, definitions, antonyms, and analogies, is evaluated and recommended by the Houston Independent School District's Department of Technology.

The Social Studies

A year ago, according to Nancy Roberts, associate professor at Lesley College, Graduate School of Education, Cambridge, Mass., social studies teachers were "last in line for computers." Their professional meetings and publications had been slowest to include CAI. One reason may be that computers originated in the quantitative world, foreign to many social science instructors.

Ironically, Roberts believes, the disciplines of history, sociology, political science, economics, geography, and world cultures are especially appropriate for a variety of computer applications. Practicing social scientists make important use of computers in their research. Large amounts of information are readily available from data bases. New software is emerging to aid in analysis of data, and computer simulations are useful for understanding complex, interdependent problems. Secondary school students need to use the computer in the classroom as the social scientist does in the real world.

During the past year, social studies teachers started taking CAI seriously. In May 1983, *Social Education*, the journal of the National Council for the Social Studies, featured a special section, "Technology and the Social Studies." The Oct. 1983 issue launched a new monthly column, "Computer Corner" by Mollie L. Cohen.

Mark D. Rothman, a teacher at Schreiber High School, Port Washington, N.Y., has created two interactive tutorial programs for grade 10-college level, produced and marketed by Focus Media, Inc.: *Revolutions: Past, Present and Future* for history classes; and *Economics: What, How and for Whom?* Both are for Apple II or TRS-80 micros.

Focus Media has also produced *U.S. History: The Young Republic, Non-Western Cultures*, and *Western Civilization*, drills and educational games for Apple II for grades 7-10. Queue offers *Africa*, a tutorial for grade 7-adult level; *Regions of the United States*, 5-12; *Annam: The Study of a Developing Country*, a simulation for grade 7-adult level; and *Lincoln's Decisions*, a Civil War simulation for grade 7-adult level. Queue courseware is programmed for Apple, Pet, TRS-80, or Atari micros.

Strategic Simulations, Inc. offers *President-Elect* for Apple II Plus, grades 9-12, a simulation of a presidential election campaign in which students may choose any election since 1960, project the 1984 election, select a hypothetical or a real candidate, or run for President themselves.

Simulation courseware for economics classes include *Jeans Factory*, developed at the Center for Economic Education, University of Kansas for grades 10 and up (Apple and TRS-80). Students decide production levels and selling prices in a hypothetical jeans factory during a 6-month period. Micro Media has produced *Oil Tycoon*, another economics simulation for grades 7-12 (TRS-80) and *Demo-Graphics* for teaching population dynamics, for high school-college levels (Apple).

Strategic Simulations' *Cartels and Cutthroats*, grades 10-12 (Apple) and MECC's *Marketplace, Sell Apples, Sell Bicycles, Sell Lemonade*, and *Sell Plants*, all for grades 4-9 (Apple) have been approved and recommended by the Educational Software and Evaluation Consortium.

Foreign Languages and ESL

Just as word processors enhance writing in English, so do they in foreign languages. The *Multi-Lingual Word Processor*, designed for Apples, provides accented upper-lower case letters for Spanish, French, German, Italian, Danish/Norwegian, Finnish/Swedish, Hawaiian, and Hungarian target languages for English native speakers. A free brochure is available from The Professor, Box 301, Swanton, Vt. 05488 (514) 747-9130.

Because courseware in foreign languages is still quite limited, the development of authoring systems for teachers is valuable and cost effective. Teachers who have had hands-on experience with micros but are not trained programmers can use these software authoring systems to develop their own programs. Nancy E. Post of the American Language Academy, 11426 Rockville Pike, Rockville, Md. 20852, recommends use of these utility programs. She will furnish reprints on request of her article, "Microcomputers and Language Training," *The Journal of Educational Technology Systems*, Vol. II (4), 1982-83.

The National Center for Bilingual Research has established the CALIB (Computer-Assisted Language Instructional Bibliography) Database. The network serves any school interested in CAI for teaching foreign languages, bilingual education, and ESL. The Center has just published a 214-page volume, *Microcomputers in Bilingual and Foreign Language Instruction: A Bibliography*, available for $16.50 prepaid, payable to SWIRL Educational Research, c/o the Center, 4665 Lampson Ave., Los Alamitos, Calif. 90720 (213) 598-0481.

The Center expects this volume will be the last it will publish as it hopes CALIB Database will increase so fast and so much that no book could possibly contain such a long list. CALIB Database does not evaluate or recommend courseware, but the Center hopes that teachers using any of the programs will recommend them to others. To that end, the volume lists names of teachers and their schools, addresses, and phone numbers for 30 states and 10 foreign countries who use CALIB.

The Appendix lists each courseware program; address and phone of vendor; hardware requirements; native language and target language of students; grade level; price; and a description of the contents. Of the 550 programs described, 70 are authoring and classroom management systems; 360 are for foreign-language instruction; 45 are for ESL that do not specify the native language; and 75 for native speakers of Spanish, 35 of which are also available for speakers of Lao, Vietnamese, and Hmong, and one each for native speakers of French and Mandarin Chinese.

Of the 360 foreign language programs for speakers of English, 120 are for the target language French; 100, Spanish; 90, German; 30, Russian; 10, Italian; 7, Hebrew; 5, Latin; and one each, Danish, Dutch, and Yiddish.

Exempli Gratia

MURRY BERGSTRAUM HIGH SCHOOL FOR BUSINESS CAREERS, 411 Pearl St., New York, N.Y. 10038. *Contact:* Barbara L. Christen, principal.

Located across from City Hall, at the foot of the Brooklyn Bridge, and down the block from Manhattan's Wall Street, this educational-option school is part of New York's public school system. It opened in September 1975 to students who applied from the 32 elementary school districts of the city's five boroughs. Applications from 22,000 8th and 9th graders were filed for the 1983-84 school year, but there was room for only 900.

The coed student population, grades 9-12, is largely minority with 15 percent white. Fifty percent of the students are on-level academically, 25 percent are above level, and 25 percent are below level.

The aims of the school are to provide students with an awareness of opportunity, understanding of the nature of business, and a "foot in the door" to the business world. Academic graduation requirements are the same as for all the other New York City high schools, but in addition, Bergstraum graduates must have taken courses in typing, computer literacy, one year of a foreign *or* computer language, Business Orientation, and one of five three-year sequences: Secretarial Skills, Accounting, Marketing, Securities and Finance, or Computer Science for Business. Data processing, word processing, and computers are used in the five sequences. Computers are also used to assist instruction in math, science, and the humanities.

The Computer Science for Business program is career-oriented. Its aims are to provide students with skills for immediate entry-level jobs in business; hands-on experience with computers; and recognition of the fast rate of change in high tech, emphasizing concepts rather than simply use of current special equipment. The courses in the sequence, organized by assistant principal Stan Montz, are —

- *Sophomore Year:* four daily, one-semester classes in Accounting, Introduction to Data Processing, Data Entry, and Computer Programming for Business in BASIC.
- *Junior Year:* one daily double-period, full-year course in a second computer language, RPG Programming, a practical, non-theoretical language for small IBM systems; and one semester of Systems Control.
- *Senior Year:* one daily, double-period, full-year course in COBOL, the most widely used computer language for business. As with the RPG course in the junior year, the second of the two periods each day sends the students to the microcomputer lab to produce individually assigned programs. Deadlines must be met just as they would have to be in the real business world. A daily one-period course, Advanced Applications, requires students to work in teams of three to produce programs by deadline.

Students in the Computer Science for Business major also may be unpaid, one-full-day-a-week interns, or paid or unpaid after-school interns at such cooperative businesses as Dun and Bradstreet, Chase Manhattan Bank, Salamon Bros., and Shearson/American Express. Another private-sector offering is IBM's *Project Insight*, which hosts students at IBM facilities for viewing hardware and software and having lunch.

The school's Business Advisory Board Council are executives and business leaders of the Wall Street district. They assist the faculty in updating curriculum and by serving as resources in classes. They also fund $600 scholarships for after-school unpaid interns who are high achievers. Of Bergstraum graduates, 80-85 percent go on

to higher education, part-time or full-time.

Model Computer Science Program: Preparation for Direct Entry into the Business Community is a 90-min. cassette tape recorded at the 1983 NASSP convention in Dallas. It gives a detailed description of the Bergstraum curriculum and is available for $6.50 plus shipping and handling from NASSP.

RED BUD HIGH SCHOOL, 815 Locust St., Red Bud, Ill. 62278. *Contact:* Wayne Collmeyer, principal.

When they approach the town of 2,900 people in Illinois, 40 miles southeast of St. Louis, visitors are awed by the springtime beauty of the trees for which the town is named. They and residents are equally impressed by the academic quality of Red Bud High School, grades 9-12, with a student enrollment of 500. During the 1983 centennial observance of Illinois' mandatory public education law, the Illinois Board of Education gave Red Bud a first-place plaque for academic excellence. The school was also one of five in the state to be nominated for the Presidential Awards of 1983.

In the spring of 1982, Red Bud's board of education needed to replace manual typewriters with electrics and to purchase microcomputers for a new programming course. Business education and agriculture teachers also expressed interest in using micros for classroom learning. The board decided to explore the possibility of using micros for advanced typing, computer programming, data processing, agriculture, and accounting classes.

That summer a computer lab was installed with 20 Commodore 8032s, two MUPET disk-drive systems, each linking 20 micros to a dual disk drive and printer. The *Word Pro 4+* word processor is used in the typing class and English Composition. The lab is used for Agriculture, Advanced Typing, Office Practice, Introduction to Computer Programming, and Introduction to Data Processing.

By fall of 1983, another lab was installed with 12 Apple IIe micros for Advanced Programming in PASCAL, AP, Advanced Accounting, beginning math courses including a two-week unit in computer literacy, and advanced math classes.

Inspired by the Ferguson-Florrisant Writing Project, Michael Crocket, speech teacher, is using computers to teach English Composition. John Osman, an English teacher, uses them to teach Creative Writing, free of the clutter of paper rewrites.

Red Bud's computer curriculum is supported not only by an enthusiastic board of education, administration, faculty, and parents, but also by the Ten County Computer Consortium (TENCO) whose formation it inspired. TENCO serves 10 Illinois counties from its headquarters, Educational Development Center, 1505 Caseyville Ave., Belleville, Ill. 62220 (618) 277-4530.

In November and December 1983, TENCO offered 16 microcomputer training workshops for teachers and administrators of 85 public, 80 private, and 20 special education school districts. Because TENCO is an institutional member of MECC, all the schools TENCO serves have cost-effective access to MECC courseware.

GEORGE WASHINGTON HIGH SCHOOL, 655 S. Monoco Parkway, Denver, Colo. 80220. *Contact:* Irwin J. Hoffman, mathematics and computer science teacher; developer, Bilingual LIRIC Project.

The 38 Ataris and Apples in the bustling lab at this inner city school are in such demand that the lab opens at 6 a.m. weekdays and stays open on Saturdays. The micros are used by students studying business, writing, art, math, special education, computer science, home economics, science, music, social studies, and English as a Second Language (ESL).

Mastermind of all this activity is Hoffman, who has taught at the school 22 years and has received the Presidential Award for 1983 and the Colorado Teacher of the Year Award of 1982-83. His most recent achievement is as developer of the Bilingual LIRIC Project of the Denver Public Schools.

Funded by an ESEA Title VII three-year grant, beginning in 1981, LIRIC (Language Instruction for Recent Immigrants Through Computer Technology) is a supplemental program for secondary students in bilingual education and ESL. The ESEA grant called for development of 40 lessons with translations available for the Denver district's four major non-English, native languages: Spanish, Vietnamese, Laotian, and Hmong.

Much of LIRIC was developed at George Washington High School, with lessons written and edited by Denver Public School personnel. The lessons were programmed by a team of high school students who also did the graphics. During 1983-84, the 13 disks of 40 lessons, for Apple II, are being piloted in several city high schools. Now that the technology has been developed, it will be possible to expand the courseware to include additional languages and lessons.

"Writing with a word processor makes editing effortless. Adding to, taking from, and moving around of text is simple."

Following this year of field testing and revisions, LIRIC will be ready for full dissemination. Meanwhile, a *LIRIC Introductory Packet* has been created to acquaint prospective users with LIRIC materials. A guide is included with a sample disk containing three lessons in Spanish and three in Laotian. Cost of the packet is $15 for disk, reproduction of disk, written materials, and postage. Checks should be made payable to Magnetic Card Fund and sent to the attention of Hoffman at George Washington High School.

Hoffman reports that he and his associates have also designed a new course that will be added to the curriculum when the high school has at least 30 more micros on board. The course is *Technical Term Paper Writing*, nine weeks of technical word processing and nine weeks of term-paper writing.

Meanwhile, the school offers two semesters of computer business classes in which students learn to program in BASIC and apply their knowledge to trade discounts, alphabetical sorting, and payroll. Two other courses, *Advanced Accounting* and *Business Machines*, teach the use of spreadsheets and word processing.

LYONS TOWNSHIP HIGH SCHOOL, 100 South Brainard Ave., LaGrange, Ill. 60525. *Contacts:* Estella Gahala, director of curriculum and instruction; Dave Briggs, English department chair.

This large suburban school's five-year *Computer Literacy Comprehensive Program* was featured in the *Exempli Gratia* section of Part I of this Curriculum Report series (Nov. 1983). Lyons reappears in Part II with another exemplary project, *Computer-Assisted Instruction and Word Processing in the Writing Program.*

The seven-phase project in the English department started June 15, 1983, continued during the summer and the 1983-84 school year, and is targeted for completion the summer of 1984. The aims are to —

- Reexamine the English composition curriculum
- Redefine goals and expectations in composition
- Explore how the department can most effectively use CAI and word processing to enhance the composition program. (This aim demands time, money, human resources, and a commitment to experimentation, because at present no research exists to demonstrate the effectiveness of CAI in this area of instruction.)

The project schedule is as follows:

Phase I, "Preparing," June 15-17, 1983, by nine English staff members, dealt with the first two aims.

Phase II, "Groundwork and Direction," June 20-23, a workshop for eight English staff members and two consultants, explored the possibilities CAI offers as a supplement to traditional methods of teaching writing as defined by Phase I.

Phase III, "Training," July 5-8, a seminar for eight English staff members and two word processing instructors, taught the English teachers how to use *SuperSCRIPSIT*™ on TRS-80 Model III micros.

Phase IV, "Designing," Aug. 22-26, for programmers and workshop participants who already had a CAI project "in progress" that supports the overall plan as outlined in Phase II, designed CAI courseware, identified and examined available commercial courseware, designed and programmed CAI courseware, and examined potential use of the *AUTHOR* system already purchased for TRS-80 teacher users.

Phase V, "Implementing," 1983-84 school year, for English staff and the workshop participants on an in-service basis, is testing the programs designed during Phase IV in experimental English class sections of different grade and ability levels.

Phase VI, "Evaluating," one day in April 1984, for workshop participants and a consultant, will evaluate CAI and word processing experiences to date and identify new projects as well as additional work needed.

Phase VII, "Expanding," Summer 1984, participants of the 1983 Summer Workshops as inservice personnel with other high school staff and programmers, will expand, design, and develop other CAI courseware in English and extend CAI to other academic areas.

HOUSTON INDEPENDENT SCHOOL DISTRICT, Department of Technology, 5300 San Felipe, Houston, Tex. 77056. *Contact:* Patricia Sturdivant, associate superintendent.

With a $3.4 million budget for its first year of operation, the Technology Department Center of Houston's 200,000-pupil K-12 district opened on July 21, 1982. The department's 32 staff members coordinate all the district's technological programs, including educational television and computers for school administration and instruction.

The department also administers the purchase of all technological equipment, office equipment, and computer hardware and courseware that individual schools apply for.

When the center opened, with a symbolic cutting (not of a ribbon but of a computer print-out banner) the department had published its first volume to assist schools in developing their computer curricula: *Technology Planning Document, 1982-83* (158 pp.). It is available for $20 from the department.

The following year the department published *Manual for Writing a Microcomputer Implementation Plan,* with materials updated through June 1983 (121 pp.). It is available for $25.

While the large Houston school district is a consortium in itself, helping all its schools to develop and implement their computer curricula and select recommended courseware, it is also virtually a consortium for other school districts that have no other consortium nearby. Associate superintendent Sturdivant is pleading to educators nationwide for the establishment of an Educational National Courseware Consortium for Programming America for the Information Age.

Sturdivant points out that in 1980 Houston spent $155,000 on computer software. By 1983 the cost was $225,000, and in another two years the number of micros in district schools is expected to triple from 1,500 to 4,500. The district's $1 million software expense in 1985 will increase proportionately as the number of micros increases. A national consortium is needed to help all schools ease financial strain and to evaluate courseware, Sturdivant believes.

Through the Houston Department of Technology Center and MECC, other schools can purchase evaluated and recommended courseware, such as Mesa County Valley School District No. 1 in Grand Junction, Colo. has done. (See NASSP *Curriculum Report,* Nov. 1983, p. 5.)

Besides administrative computer programs, the Software Resource Library of the Houston Department of Technology Center has available 36 instructional secondary-level courses in all academic subject areas. Each course is described in full in *Manual for Writing a Microcomputer Implementation Plan,* with price, publisher, hardware requirements, and grade level. The library also has 32 MECC programs that are available to the districts that have purchased limited rights to distribute MECC courseware through institutional memberships.

OAK GROVE HIGH SCHOOL, 285 Blossom Hill Rd., San Jose, Calif. 95123. *Contact:* Guy Klitgaard, principal.

When Guy Klitgaard was principal at Independence High School in the San Jose Unified School District, the faculty developed and implemented a program of microcomputer-assisted instruction. He is now principal of Oak Grove High in the same district, and he and his new faculty have just started a new CAI program there.

He is also organizing the NASSP Institute, Microcomputers in Secondary Instruction, which will be

held at the Cathedral Hill Hotel, San Francisco, March 15-17, 1984. Staff members from both Oak Grove and Independence High will be presenters at the Institute. (For enrollment information, contact NASSP Inservice Office, 1904 Association Dr., Reston, Va. 22091 (703) 860-0200 or 8430.)

Thanks to California's new law that permits tax writeoffs to industries that donate micros to schools, Oak Grove has a mainframe mini Digital PDT-II and 32 terminals in a new lab in the science wing for computer literacy and programming courses. Business education students are using 25 TRS-80s, also donated, and two Ataris in their word processing lab. An Apple micro with coin-operated terminals is in the school library for student and faculty use.

HOWARD COUNTY PUBLIC SCHOOLS, 10910 Route 108, Ellicott City, Md. 21043. *Contact:* Stephen Tegarden, director of high schools.

This county school district has eight comprehensive high schools and a vocational technical center, with a 9-12 grade student population of 9,000. Since 1980, the two Apple computers in each of the comprehensive high schools have been used primarily for computer science, math, and science courses. But by the fall of 1983, seven of the high schools had 12 Apples each. The other comprehensive high school, as a pilot project, expanded its micro lab to 30 student terminals for computer instruction in English, foreign languages, and social studies.

A five-year plan by a countywide Steering Committee on Computers includes a similar expansion in the other seven high schools, all of which have required three-week computer awareness courses since 1982.

Courseware includes programs created by faculty members, augmented by $5,100 worth of MECC programs, as the district is an institutional member of that consortium.

The Vocational Technical Center has an IBM 360/175 mainframe and Univac 9200 mainframe. The microcomputer lab has 24 Apples with disk drives and printers and several TRS-80s for instruction in the practical arts and vocational education for courses in programming in COBOL and RPG business languages.

Because none of the eight comprehensive high schools this year has enough seniors to warrant a course in Computer Science in Programming PASCAL, AP, students who plan to take the AP exam in May 1984 meet at the Vocational Technical Center after school to take the course.

The five-year plan of the district's Steering Committee on Computers includes a set of annual goals for elementary, middle level, and secondary schools, involving staff and organizational structure, hardware and courseware evaluation and acquisition, computer-assisted curricula, teacher training, and evaluation.

Director of high schools Steve Tegarden will be a presenter at the NASSP Institute, Using Microcomputers Effectively in School Management and Curriculum, April 5-7, 1984, at the Sheraton Inn, Portland, Maine. (For enrollment information, contact the NASSP Inservice Office.)

Kudos

Barbara Pannwitt, who prepared this report, thanks the principals and other *Exempli Gratia* contacts for their enthusiasm, guidance, and information.

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